

-1-

DESCRIPTION

AN ENVELOPE FOR RECOVERING A RECORDING LIQUID CARTRIDGE

5

TECHNICAL FIELD

The present invention generally relates to an envelope for recovering a recording liquid 10 cartridge which is used in an image printing device such as an ink jet recording device.

BACKGROUND ART

15 An ink jet recording device using ink as the recording liquid is employed as an image forming device in printers, facsimiles, copying machines and their hybrid machines. In these ink jet recording devices, it is common to replace an ink cartridge, 20 which is a recording liquid cartridge for supplying ink to a recording head.

In the past, after such ink cartridge replacement, used ink cartridges were thrown away by users. Recently, however, because of requirements 25 for efficient resource usage and environmental

-2-

preservation, used cartridges have been recovered by ink cartridge suppliers.

Patent Reference #1 below discloses a method for recovering used recording liquid 5 cartridges, in which a recovering box is used for recycling. In this method, however, it is inconvenient in that users must go to where a recovering box is placed.

Patent Reference #2 below discloses 10 another method for recovering used recording liquid cartridges, in which transportation such as mailing is employed for recovering such cartridges. In this method, a name and address of destination and other information are written on an outer surface of an 15 ink cartridge. After replacement, users can seal the ink inlet and outlet of a used cartridge and mail it to the cartridge supplier.

In this method, however, it is troublesome for users to seal the ink inlet and outlet of used 20 cartridges. And users may get ink on their hands. If the user's sealing is incomplete, highly transmittable ink for such ink jet recording devices may leak out and make a mess of other transported goods.

-3-

Open Publication 2003-182804

Patent Reference #2: Japanese Patent Laid-
Open Publication 5-30106

5 DISCLOSURE OF THE INVENTION

It is a general object of the present invention to provide an envelope for recovering such a recording liquid cartridge, which can be easily 10 used and can prevent ink leakage.

Features and advantages of the present invention are set forth in the description that follows, and in part will become apparent from the description and the accompanying drawings, or may be 15 learned by practice of the invention according to the teachings provided in the description. Objects as well as other features and advantages of the present invention will be realized and attained by the envelope particularly pointed out in the specification in such full, clear, concise, and exact terms as to enable a person having ordinary 20 skill in the art to practice the invention.

To achieve these and other advantages and in accordance with the purpose of the invention, as 25 embodied and broadly described herein, the invention

-4-

provides as follows.

An envelope for recovering a used recording liquid cartridge according to the present invention that solves the above problems comprises
5 an inner layer made of material capable of absorbing recording liquid; and an outer layer made of water resistant material.

According to this envelope, even if recording liquid leaks from the cartridge put into
10 the envelope, the liquid can be absorbed by the inner layer to prevent from leaking outside of the envelope. It is easy for users to mail used cartridges, and the recording liquid of used cartridges does not make a mess of other transported
15 goods.

Another envelope for recovering a used recording liquid cartridge according to the present invention comprises an inner layer made of material capable of absorbing recording liquid; a middle
20 layer made of water resistant material; and an outer layer made of writable material.

According to this envelope, besides the above advantages, users can write a name and address of destination.

25 Further, an envelope for recovering a used

-5-

recording liquid cartridge according to the present invention comprises a main body of the envelope; and a foldable sealing portion capable of sealing an opening of the envelope by folding at a reference 5 line; wherein a portion of the main body is extended over the reference line at both sides of the sealing portion.

According to this envelope, it is possible to prevent liquid from leaking out at a potential 10 opening due to capillary phenomenon.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of an 15 envelope for recovering a recording liquid cartridge according to an embodiment of the present invention.

Fig. 2 is a cross-sectional view illustrating a structural example of the envelope.

Fig. 3 is a cross-sectional view 20 illustrating another structural example of the envelope.

Fig. 4 is an enlarged perspective view of the envelope.

Fig. 5 is a plan view of the envelope.

25 Fig. 6 is a plan view of the major portion

-6-

of the sealed envelope.

Fig. 7 is a plan view of the major portion of a comparison sample sealed envelope.

Fig. 8 is a perspective view of an example 5 of an ink cartridge.

Fig. 9 shows an example of an ink bag.

BEST MODE FOR CARRYING OUT THE INVENTION

10 In the following, embodiments of the present invention are described with reference to the accompanying drawings.

Fig. 1 is a perspective view of an envelope for recovering a recording liquid cartridge 15 according to an embodiment of the present invention.

Fig. 2 is a cross-sectional view for illustrating a structural example of the envelope. Fig. 3 is a cross-sectional view for illustrating another structural example of the envelope. Fig. 4 is an 20 enlarged perspective view of the envelope. Fig. 5 is a plan view of the envelope.

The envelope 1 is for recovering an ink cartridge 101 that is a used recording liquid cartridge. As shown in Fig. 2, the envelope 1 has a 25 two-layer structure comprising an inner layer 11 and

an outer layer 12. The inner layer 11 is made of material capable of absorbing ink, for example thin paper. The outer layer 12 is made of water resistant material, for example PE. The inner layer 5 11 and the outer layer 12 are heat sealed.

Due to this two-layer structure, even if ink is leaked out from the used ink cartridge 101 put into the envelope 1, the inner layer 11 keeps the leaked ink and the water resistance of the outer 10 layer 12 does not allow the ink to transmit to the outside. Therefore, the envelope does not make a mess of others with the leaked ink while transporting. Even if the envelope 1 is exposed to rain, the water resistance of the outer layer 12 15 prevents the envelope 1 from ripping or breaking. Heat sealing the inner layer 11 and the outer layer 12 to achieve integration prevents the inner layer 11 from weakening even when the inner layer 11 absorbs the ink.

20 As shown in Fig. 3, the envelope 1 may have a three-layer structure having an inner layer 21, a middle layer 22 and an outer layer 23. The inner layer 21 is made of material capable of absorbing ink, for example thin paper. The middle 25 layer 22 is made of water resistant material, for

-8-

example PE. The inner layer 21 and the middle layer 22 are heat sealed. The outer layer 23 is made of material allowing writing thereon, for example, craft paper, and is stuck to the middle layer 22.

5 In this three-layer structure, the middle layer 22 functions in the same manner as the above mentioned outer layer 12 resulting in the same effect as in the two layer structure. Besides, information such as sender's name and address can be
10 written on an outer surface of the outer layer 23.

As shown in Figs 4 and 5, the envelope 1 has a sealing slip 3 at a sealing portion. The sealing slip 3 can be valley-folded at a folding reference line 4, to seal an opening 2a of a main body 2 of the envelope 1. At each end of the sealing slip 3, a portion 5 of the main body 2 of the envelope 1 is formed continuously over the folding reference line 4, as shown in Figs. 4 and 5. That is, the portion 5 of the main body 2 of the
15 envelope 1 is extended over the valley-folding reference line 4 and is folded at the valley-folding line 4, to the perpendicular direction. A paste face is formed or a double stick tape is fixed on the sealing slip 3 to adhere to the main body 2 of
20 the envelope 1.
25

-9-

As shown in Fig. 6, after valley-folding the sealing slip 3 at the folding reference line 4, the portion 5 of the main body 2 of the envelope 1 is folded over or laid over at both sides of the 5 sealing slip 3, and therefore the opening 2a is not exposed at an end 2b of the main body 2 of the envelope 1. Accordingly, the ink leaked out from the ink cartridge 101 put into the envelope 1 cannot leak to the outside of the envelope 1.

10 In general, liquid such as ink penetrates small cross-sectional places well due to the capillary phenomenon. As shown in Fig. 7, if there is no portion 5 of the main body 2 of the envelope 1 at each end of the sealing slip 3, after folding the 15 sealing slip 3 at the folding reference line 4, there remains an opening or gap at A portion at each end between the sealing slip 3 and the main body 2 of the envelope 1. This opening or gap portion allows ink to easily penetrate better than other 20 portions, and therefore even a small amount of ink can be leaked out. In order to avoid such leakage, the portion 5 of the main body 2 of the envelope 1 is extended.

Similarly, at a bottom portion of the 25 envelope 1, a portion 9 (see FIG. 5) of the main

-10-

body 2 of the envelope 1 is extended over a folding reference line 8 at each end of a sealing slip 7. The sealing slip 7 is to be valley-folded along the folding reference line 8 to seal the envelope 1. In 5 this way, it is possible to prevent the ink leaked out from the ink cartridge 101 put into the envelope 1 from leaking to the outside due to the capillary phenomenon.

Next, with reference to Figs 8 and 9, one 10 example of such an ink cartridge 101 is explained, which is suitable for recovering by using the envelope 1.

The ink cartridge 101 shown in Fig. 8 comprise's an ink bag 102 to be filled with ink, and 15 a housing 103 to contain the ink bag 102. The housing 103 comprises a first housing part 111, a second housing part 112 and a third housing part 113. The first housing part 111 and the second housing part 112 form a protection cover having a thin box 20 figure to protect the sides of the ink bag 102.

The ink bag 102 comprises a rectangular-shaped flexible bag body 121 made of aluminum laminated films, and a plastic holding member 122 fixed or sealed to one longer side of the bag body 25 121. The plastic holding member 122 is provided

-11-

with an ink outlet 123 for supplying ink within the bag body 121 to an image printing device. The ink outlet 123 is sealed by a self-sealable member, made of such as butyl rubber resilient material.

5 In this way, since the ink cartridge 101 is formed by the box-like housing 103 and the ink bag 102 is contained in and protected by the housing 103, it is easy to put the ink cartridge 101 in the envelope 1.

10 Further, the present invention is not limited to these embodiments, but various variations and modifications may be made without departing from the scope of the present invention.

The present application is based on
15 Japanese Priority Application No. JPA 2003-381624 filed on November 11, 2003, with the Japanese Patent Office, the entire contents of which are hereby incorporated by reference.